

03/06/14 Agenda

- Warm Up
- Review Homework
 - Worksheet 7.1 day 2 - Negative & Zero Exponents
- Section 7.5 day 1 - Rational Exponents & Radicals

Warm Up - Homework out!



Put your name on a slip of paper.

Simplify:

$$4ab^0 = 4a$$

$$\frac{3^{-2}}{n} = \frac{1}{3^2 n} = \frac{1}{9n}$$

$$\frac{1}{c^{-1}} = \frac{1 \cdot c^1}{1} = c$$

$$\frac{6a^{-1}c^{-3}}{d^0} = \frac{6a^{-1}c^{-3}}{1a^1c^3} = \frac{6}{ac^3}$$

Section 7.5 day 1 - Rational Exponents & Radicals

Target 7A

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Review:

$$\begin{aligned} a^m a^n &= a^{m+n} & \frac{a^m}{a^n} &= a^{m-n} \\ (a^m)^n &= a^{mn} \\ (ab)^m &= a^m b^m & \left(\frac{a}{b}\right)^m &= \frac{a^m}{b^m} \\ a^0 &= 1 & a^{-n} &= \frac{1}{a^n} & \frac{1}{a^{-n}} &= a^n \end{aligned}$$

Definitions:

Radicals:

$$\sqrt[n]{a}$$

INDEX (points to n) RADICAL SIGN (points to $\sqrt{}$) RADICAND (points to a)

The index gives the 'degree' of the root.

For a cube root, the degree is 3

$$\sqrt[3]{x}$$

When no index is written, assume the index is 2

This is usually called the SQUARE ROOT

$$5^2 = 25 \quad \sqrt{25} = \sqrt{5 \cdot 5} = 5$$

$$25^{\frac{1}{2}} = 5$$

$$\sqrt[2]{25} = 25^{\frac{1}{2}} = 5$$

$$\sqrt[3]{8} = 8^{\frac{1}{3}}$$

$$625^{\frac{1}{4}} = \sqrt[4]{625}$$

There are 2 ways to simplify: $\sqrt[3]{5^3}$

1.) $\sqrt[3]{125} = \sqrt[3]{5 \cdot 5 \cdot 5} = 5$

Diagram: A tree diagram showing 125 factored into 5 and 25, and 25 factored into 5 and 5. The 5s are circled.

2.) $\sqrt[4]{2^4} = 2$

Diagram: A tree diagram showing 16 factored into 4 and 4, and 4 factored into 2 and 2. The 2s are circled.

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You try:

$$\begin{array}{l} \sqrt[3]{27} = \sqrt[3]{3^3} \\ \quad \wedge \\ \quad 9 \cdot 3 = 3 \\ \quad \wedge \\ \quad 3 \cdot 3 \end{array} \quad \begin{array}{l} \sqrt[5]{32} = 2 \\ \quad \wedge \\ \quad 4 \quad 8 \\ \quad \wedge \quad \wedge \\ \quad 2 \cdot 2 \quad 2 \cdot 2 \cdot 2 \\ \quad \wedge \quad \wedge \\ \quad 2 \cdot 2 \quad 2 \cdot 2 \end{array} \quad \begin{array}{l} \sqrt[3]{64} = 4 \\ \quad \wedge \\ \quad 4 \cdot 16 \\ \quad \wedge \\ \quad 4 \cdot 4 \end{array} \quad \begin{array}{l} \sqrt{36} \\ \quad \wedge \end{array}$$

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You can also write rational expressions like $\frac{2}{3}$ in radical form.

$$8^{\frac{2}{3}} = 8^{2 \cdot \frac{1}{3}} = \left(8^2\right)^{\frac{1}{3}} = \sqrt[3]{8^2}$$
$$\rightarrow 8^{\frac{1}{3} \cdot 2} = \left(8^{\frac{1}{3}}\right)^2 = \left(\sqrt[3]{8}\right)^2$$

YOU CAN ALSO WRITE RATIONAL EXPRESSIONS
LIKE $\frac{2}{3}$ IN RADICAL FORM

$$8^{\frac{2}{3}} = 8^{\frac{1}{3} \cdot 2} = (8^{\frac{1}{3}})^2 = (\sqrt[3]{8})^2$$


$$8^{2 \cdot \frac{1}{3}} = (8^2)^{\frac{1}{3}} = \sqrt[3]{8^2}$$

$$8^{\frac{2}{3}} = \sqrt[3]{8^2} = (\sqrt[3]{8})^2$$

$$a^{\frac{1}{n}} = \sqrt[n]{a} \text{ AND}$$

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$$

$$\sqrt{16} = 4 \Rightarrow 4^2 = 16 \quad \sqrt{-16}$$

$$\sqrt[3]{8} = 8^{\frac{1}{3}} = 2$$

$$\sqrt[3]{-8} = -2$$

$$\sqrt[3]{-8} = -2$$

$$(-2)^3 = (-2)(-2)(-2)$$

$$4(-2)$$

$$-8$$

$$8^x = 64$$

$$\sqrt[4]{64} = 8$$

$$5^x = 625 \quad \sqrt[4]{625} = 5$$

$$\sqrt{20} = \sqrt{2 \cdot 2 \cdot 5}$$

$$2\sqrt{5}$$

$$\sqrt{36}$$

$$\sqrt{36}$$

$$\begin{array}{cc} \swarrow & \searrow \\ 4 & 9 \end{array}$$

$$\begin{array}{cc} \wedge & \wedge \\ 2 \cdot 2 & 3 \cdot 3 \end{array}$$

$$\sqrt{36} = \sqrt{2 \cdot 2 \cdot 3 \cdot 3}$$

$$2\sqrt{3 \cdot 3}$$

$$2 \cdot 3 = 6$$